ELECTRIC VEHICLE ENERGY STORAGE REQUIREMENTS

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The Department of Energy has conducted research in electric vehicle batteries for nearly two decades. In 1991, the Department began working more closely with the automotive industry, as represented by the United States Advanced Battery Consortium (USABC) to develop electric vehicle batteries.

USABC defined initial goals for their proposed development program in 1991, and began a series of development programs based on several different battery technologies.

This presentation reexamines the goals set by the USABC in terms of public information about the advanced batteries that have been developed to date. It also examines how the battery characteristics are reflected in the first generation of electric vehicles that have recently been announced by the American and Japanese automotive industry.

The key focus of this presentation is on the four major battery parameters, energy, power, life, and cost. Each of these parameters is explained in terms of how it relates to the basic characteristics of the electric vehicle.

Energy and power are reflected in vehicle range and acceleration performance. Both of these characteristics are important initial attributes to customers, especially when these characteristics are viewed in comparison to conventional vehicles.

Battery life is also important because users have certain expectations about a vehicle's service and economic life. Current lead acid batteries are replaced in service every 2 to 3 years. Advanced batteries are projected to have longer lives, yet to date the lack of adequate laboratory and field test experience gives a limited basis for establishing life expectations and suitable warrantees.

The final concern of both manufacturers and customers is overall electric vehicle costs. Advanced batteries are an important component of the vehicle cost equation. However, even for nickel metal hydride batteries, production experience is only in the transition from hand built to pilot production techniques. Life and cost must be more firmly established. Pilot production and field testing are required to validate these technologies for life and cost.